

WHAT IS GENETIC DETECTION ANALYSIS?

Scorpions analyses look for specific matches in an organism’s DNA (deoxyribonucleic acid), the molecule that makes up genes, the information code that determines the nature and type of an organism.

HOW CAN DNA CONFIRM THE PRESENCE OF AN ORGANISM IN MY SAMPLE?

Genetic analysis exploits the subtle differences in a microbe’s DNA to detect the presence of that organism. We use DNA to look for “signatures” of specific spoilage microorganisms in wine and other beverages. Using proprietary Scorpions™ probes, we can detect the specific DNA molecules that act as the “fingerprint” for spoilage microbes in your wine. If a specific DNA signal is generated it means that the corresponding spoilage organism is present in your wine.

WHAT ORGANISMS CAN YOU DETECT?

The Yeast Panel detects fermentation and spoilage yeast (Saccharomyces, Brettanomyces, and Zygosaccharomyces). The Bacteria Panel detects malolactic bacteria, lactic acid bacteria, and acetic acid bacteria (Oenococcus, Lactobacillus, Pediococcus, and Acetic Acid bacteria) and can be used to assess stuck and sluggish fermentations. The Combined Panel includes all the yeast panel and bacteria panel organisms, giving you the most complete analytical picture of spoilage organisms in your wine.

IS THERE A SPECIFIC SAMPLING METHOD?

This is one of the most important aspects of any analysis. The sample should be homogenous and a true representation of the lot you are testing. ETS can help you develop an appropriate sampling strategy. The same sampling limitations for plating apply to Scorpions™ sampling. We will be happy to discuss sampling methodologies with you.

HOW DOES REAL-TIME SCORPIONS™ DETECTION COMPARE TO OTHER MICROBIOLOGICAL TECHNIQUES?

Gene specific analysis offers a real-time snapshot of a microbial population. Identification of organisms is extremely accurate providing faster turnaround time and more precise quantification of spoilage populations than other methods.

DOES REAL-TIME GENETIC DETECTION ELIMINATE THE NEED FOR PLATING AND CHEMICAL ANALYSIS?

No. Gene specific analysis should be part of an integrated, comprehensive quality control program that is complemented by chemical analysis and plating, to achieve your specific production needs.

<i>ANALYSIS</i>	<i>TURN AROUND</i>	<i>IDENTIFICATION</i>	<i>DETECTION LIMIT</i>
STANDARD SCORPIONS™	48 HOURS	Genus & species	Live cell count — 10 cells/mL
CONCENTRATED SCORPIONS™	48 HOURS	Genus & species	Live cell count — 10 cells/250 mL
DIRECT PLATING	10–14 DAYS	Presumptive to genus	Culturable cells only — 10 cfu/mL
FILTER PLATING	10–14 DAYS	Presumptive to genus	Culturable cells only — 1 cfu/250 mL
MICROSCOPIC ANALYSIS	24 HOURS	Morphological class only	Total cell count — 100,000 cells/mL
4EP/4EG	48 HOURS	Brettanomyces bruxellensis metabolites or activity	N/A

HOW LONG DOES IT TAKE TO GET RESULTS?

Results are reported within two working days of receipt of samples.

DO SCORPIONS™ DETECT DEAD CELLS IN MY SAMPLE?

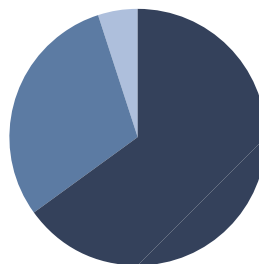
No. The low pH and the presence of phenolics and SO₂ in wine create an environment that is damaging to exposed DNA. The DNA from dead cells is rapidly damaged in wine, preventing successful amplification with the Scorpions™ assay. Our method detects intact DNA protected inside viable cells.

WHY IS THE SPECIFICALLY TARGETED GENETIC ASSAY BETTER THAN A BROAD-SPECTRUM GENETIC DETECTION ASSAY?

The sensitivity of genetic detection methods is so great that a broad assay designed to detect general groups of microorganisms would yield non-specific, positive results in almost every sample. Our specific genetic probes for common wine spoilage organisms allow the winemaker to directly monitor only those microbes that are of greatest concern, bypassing an initial non-specific broad spectrum screening.

WHY DOES MY WINE HAVE 4EP/4EG BUT NO BRETTANOMYCES DETECTED BY SCORPIONS™?

This apparent analytical inconsistency is often due to problems associated with sampling or analysis of a wine post filtration. Brettanomyces cells tend to settle to the bottom of a tank or barrel, while 4EP and 4EG are suspended homogeneously throughout the wine. If a barrel or tank sample is not thoroughly mixed at the time of sampling, there may be few, if any Brettanomyces cells in the sample. However, the 4EP and 4EG concentrations would still be representative of levels in the wine. Likewise, if a sample was filtered at porosity levels sufficient to physically remove Brettanomyces cells, there would be no detectable Brettanomyces, but 4EP and 4EG would still be present as they are not affected by filtration.



TYPICAL DISTRIBUTION OF MICROBIAL POPULATIONS

- DEAD OR DYING CELLS (1-5%)
- VIABLE AND CULTURABLE
- VIABLE BUT NONCULTURABLE (VNC)

WHAT IS THE BEST WAY TO IMPLEMENT THESE TECHNOLOGIES INTO MY PRODUCTION ROUTINE?

The potential devaluation or complete loss of a flawed wine that was diagnosed after the damage had been done can be avoided by implementing a rigorous quality control monitoring program throughout the production process. Detecting spoilage organisms early, before they have the time and opportunity to adversely affect your wine, will be the most cost effective in terms of wine quality and dollars. Use Scorpions™ genetic testing throughout the production process whenever you need immediate answers about specific microbe threats to your wine.

WHAT IF I NEED TO KNOW THE EXACT GENUS AND SPECIES IDENTIFICATION OF A MICROORGANISM ISOLATED FROM MY WINE OR CELLAR?

We have the capability to characterize and positively identify any yeast or bacteria, whether it is indigenous, a commercial starter culture, or one isolated in-house. We offer additional services that use DNA sequence comparisons to identify your microorganism to the species level. This service includes plating, isolation of DNA and comparison to existing DNA sequence databases to definitively identify your organism.

TYPES OF CELLS	SCORPIONS™	PLATING
VIABLE AND CULTURABLE	Detects	Detects
DEAD	No*	No
VIABLE BUT NOT CULTURABLE	Detects	No

* DNA from dead cells is rapidly damaged in wines.

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